

CHALCIDOIDEA BRED FROM GLOSSINA MORSITANS IN NYASALAND.

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Since my previous report on the Chalcidoid parasites of *Glossina* appeared (Bull. Ent. Res., vi, pt. 1, p. 69, 1915) a second important collection has been received by the Imperial Bureau of Entomology from Dr. W. A. Lamborn, their Entomologist in Nyasaland. In this material five species are represented, of which three here described are believed to be new. The status of the remaining two, *Stomatoceras micans*, Wtrst., and *Syntomosphyrum glossinae*, Wtrst., may now be regarded as established, in the former case from its recurrence on the same host in two widely separated localities, in the latter from Dr. Lamborn's valuable notes. Six species of Chalcidoids have now been bred from puparia of *Glossina* spp., and all from *G. morsitans*.

Family CHALCIDIDAE.

Genus HALTICHELLA, Spin.

Haltichella, Spinola, Ann. Mus. Hist. Nat., Paris, xvii, p. 148 (1811).

GENOTYPE, *H. (Chalcis) pusilla*, Fabricius, Mant. Ins., i, p. 272, ♂ ♀ (1787).

This genus, as I understand it, includes forms with the post-marginal equalling or exceeding the marginal; the wings sometimes tinted, but generally without definite bands or large spots; the lower edge of the hind femur undulated, denticulate up to three-fourths from the apex (or more shortly), but without a major tooth or prominent lobe. Scutellum bidentate; propodeon unarmed; *i.e.*, the single angle behind the spiracle upturned and inconspicuous.

The length of the post-marginal is a character of great importance for arranging the Haltichellines, but one which it is occasionally hard to estimate owing to the infuscation of the costa, which may resemble a continuation of the nervure. In such cases if the wing is looked at from behind edgewise, and highly magnified, one can generally see a distinct difference in the thickness of the costa, indicating the demarcation of the post-marginal. But it is best to examine carefully a wing mounted in balsam. With the two new species which are here assigned to *Haltichella* and *Stomatoceras (Centrochalcis)* respectively, Dr. Lamborn has enclosed another very distinct Haltichelline, not, however, bred from *Glossina*. This *Hockeria* is described in a paper (p. 419) immediately following the present one. To facilitate comparison, however, the femoral edge and neuration of the *Hockeria* have been illustrated here (figs. 1 and 2).

Haltichella edax, sp. nov.

♂. Head, antennae and thorax black; tegulae dark brownish fuscous. Abdomen: first visible segment broadly black basally, the dark area extending medianly through the second segment and into the third; at the sides posteriorly segment i. is transparent dark brown, the same colour flanking the black area on segments ii. and iii. also. Apical third of abdomen and sides entirely clear dark brown. Legs: fore coxae black; mid coxae black, but lighter on the apical one-fourth; hind coxae dark clear red, black only on the upper basal half; legs otherwise reddish, paler on

anterior tibiae and tarsi, but somewhat dusky on the hind tibiae; denticles of the femur black; claws dark brown, only the tips blackish. Wings unbanded and immaculate; hyaline near the base, but a little tinted elsewhere so as to appear dusky, especially below the marginal and on apical half; veins still more infuscated. Pubescence silvery white, darker on dorsum of abdomen posteriorly.

Head exceeding the thorax, but less than the extended tegulae in width; deeply excavated behind the scapes, the depression flanked by raised ridges along the orbits. Eyes large, separated on the vertex by one and one-third diameters. *Antennae*: length, 2.2 mm. Scape broader basally and contracted subapically, where the proportion of length to breadth is as 9:1; pedicel short, about one-fourteenth of the scape and two and a half times as long as the minute ring joint. First funicular joint longest, a little swollen dorsally; funicle cylindrical, tapered off slightly on the club; proportions, 20:17:16:15:14:13:13; and club, 10:14—there being only one clear suture. Average breadth of funicle, 15, so that the last four joints are transverse.

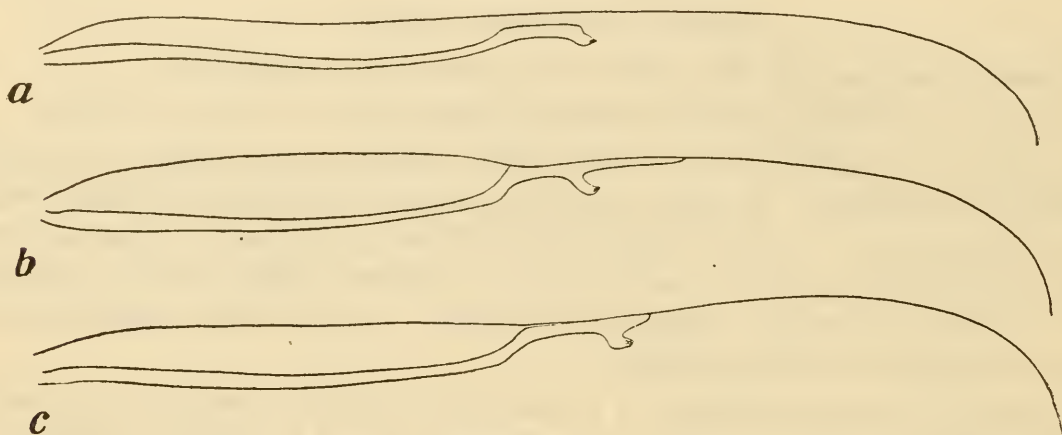


Fig. 1. Neuration of:—*a*, *Hockeria munda*, sp. n.; *b*, *Haltichella edax*, sp. n.; *c*, *Stomatoceras exaratum*, sp. n.

Thorax with thimble-like punctures all over, rather shallow and not closely set; the integument between roughened, finely reticulate. Prothorax descending abruptly behind the occiput, narrow medianly, expanded at the sides anteriorly, with a strong ridge which is much raised laterally, and indistinct only narrowly in the middle; mesonotum in the form of a long isosceles triangle, narrowing evenly backwards from the suture with the prothorax to the apex of the scutellum, which lies just over the insertion of the petiole. Scutellum bidentate, the teeth approximated and so connected medianly that the concavity between is somewhat shallow.

Propodeon triangular. The spiracle narrow and long, with one low projection behind, which being upturned is very inconspicuous from above. The central cell is broad, with an indistinct transverse ridge and two punctures before the petiole; on either side are three large cells, bounded outside by the inner ridge, before the notopleural edge. The cell between the ridge and the edge is oblong (with 4–5 indistinct transverse ridges) extending nearly to the spiracle and entirely covered with refringent bristles. There is one large cell in the angle before the spiracle and another behind it. Immediately behind the metanotum there is a row of indistinct punctures; the metapleurae are swollen and covered with short bristles.

Fore wings over two and a half times as long as broad; length, 2.9 mm.; breadth, 1.1 mm. Submarginal: marginal: radius: post-marginal, as 26:5:1:6. Pubescence of similar elements, no scales. Submarginal with 38 bristles, with short bristles 3-4 deep along its whole length below; submarginal cell closely set with bristles along its outer costal half; wing otherwise evenly ciliated, except on the basal <-shaped bare area and the hairless longitudinal line. *Hind wings*: length, 2.15 mm.; breadth, 0.65 mm. Basally the vein runs along the costa for half the length of the cell; it bears 80-90 bristles which are coarser distally; only six stiff bristles on the frenulum.

Hind legs: femur towards the apex somewhat swollen above, so that the apex itself is blunt before the tibia. Lower femoral edge not greatly convex; straight on basal half, followed by a row of denticles (23 only) running over two slight flat lobes. Hind tibia a little swollen outwardly towards the apex.

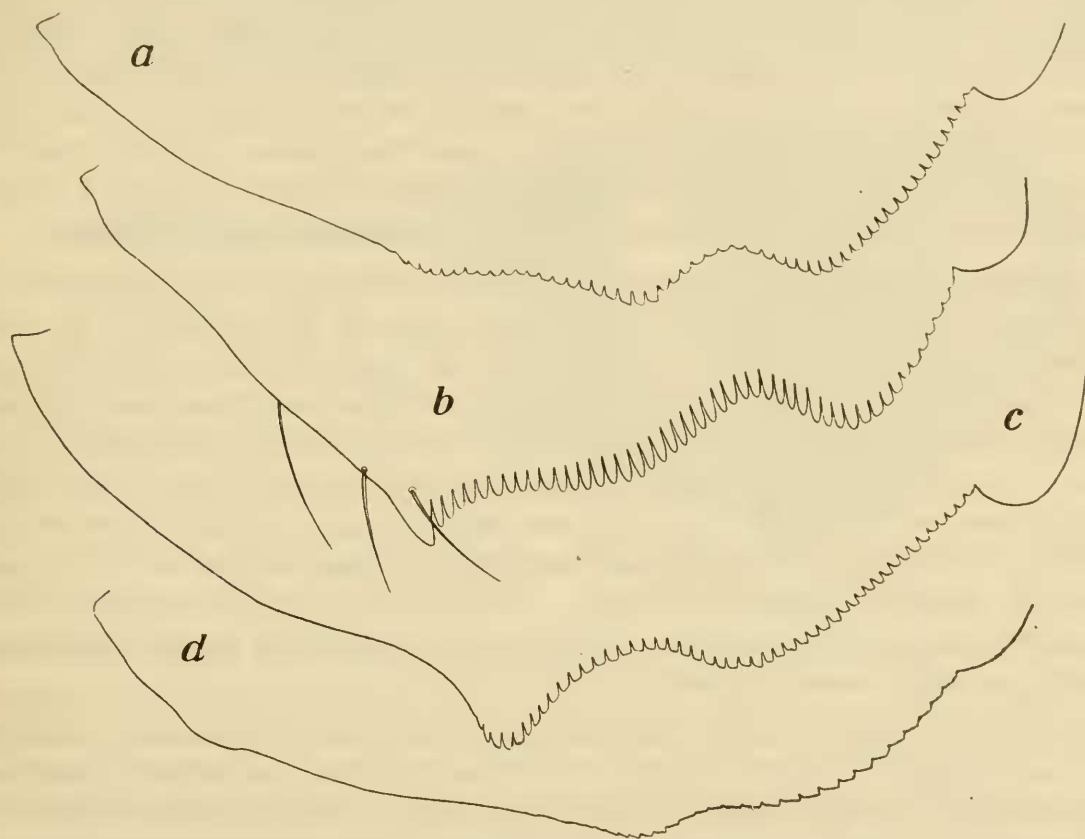


Fig. 2. Lower edge of hind femur of:—*a*, *Stomatocerus micans*, Wtrst.; *b*, *Hockeria munda*, sp. n.; *c*, *Stomatoceras octodentata*, Cam.; *d*, *Haltichella edax*, sp. n.

Abdomen: first tergite covering two-fifths of the length of the whole; tergites i. to iv. in the ratio 16:6:5:4. First tergite smooth, shining at the sides, but medianly coarsely punctate; the punctate area triangular, based on the suture, with the apex slightly behind the petiole. Second tergite broadly smooth near the suture with the first, and posteriorly coarsely punctate. The remaining tergites punctate, only the sutures shining.

Length, $4\frac{1}{4}$ mm.; alar expanse, 7 mm.

Type a ♂.

NYASALAND: Monkey Bay, Lake Nyasa; bred from a puparium of *Glossina morsitans*, 3.vi.15 (Dr. W. A. Lamborn).

Genus STOMATOCERAS, Kirby (1883).

Stomatoceras micans, Wtrst. (1915).

S. micans, Waterston, Bull. Ent. Res., vi, pt. 1, p. 69, figs. 1, 2 (1915).

NYASALAND: Monkey Bay, Lake Nyasa; 3 ♀♀ from puparia of *Glossina morsitans*, 1.vi.15 and 11.vii.15 (*Dr. W. A. Lamborn*).

Compared with the type, which is evidently undersized, these examples are altogether more robust. In length they run from $4\frac{1}{2}$ to 5 mm. (as against 4 mm.), but the alar expanse would appear to be constant at about 6 mm. The tegulae, apices of the hind femora and the tibiae are somewhat more infuscated, and the wings are darker than in the N. Rhodesian example.

The pattern of the propodeon, to which special attention was not drawn in the original description, consists of a large median cell divided by a moderately raised central ridge. The sides of the cell are formed by strong carinae from which run two series of cells—about eight in the anterior row behind the metathorax, and six to seven posteriorly. There are thus two irregular transverse ridges on each side of the central cell, one from about the middle to near the spiracle, and the other from the side of the petiolar insertion to the major lateral projection. In the Nyasaland specimens, the cells of the propodeon are slightly more elongate than in the type.

As regards the pubescence, my previous notes may stand (p. 71), with the following modification:—Except along the antero-lateral edge of the pronotum, the dorsal clothing of the thorax is golden or tawny. In all larger Chalcids, even when bred, the pubescence of this region is fugacious, but in one specimen it has been brilliantly preserved, not only on the sutures, but partially on the surfaces of the lobes as well. Unless in the case of freshly emerged material, too much reliance should not be placed on this character, for in the type specimen hardly a trace of yellow now remains, the fading having occurred in less than five months. *S. micans* may now be regarded as a regular parasite of *Glossina morsitans*. It will be of interest to ascertain whether the species is confined to one host (or host genus), or whether it affects Diptera more generally, or other insects as well.

Along with *S. micans*, there were bred 3 ♀♀ of a new Haltichelline, described below, and assigned in the meantime to the same genus. As regards non-specific characters these examples differ from the genotype *S. liberator*, Walk. (1862), only in the armature of the hind femur and the pattern of the wing (see description and figs.). It is on such differences that the validity of Cameron's *Centrochalcis* (1905) will ultimately have to be based, should the group of species so distinguished prove worthy of generic separation; for I am convinced that in dealing with the Haltichellines one cannot use successfully the *number* of antennal joints (though not the proportions) for taxonomic purposes. Whether *Centrochalcis* be allowed to stand or not, Cameron was at the time of its founding (1905) under a misapprehension with regard to the armature of the propodeon of *Stomatoceras*, Kirby. It may also be remarked that while *Centrochalcis*, Cam. (1905), is a true Haltichelline, *Centrochalcis*, Cam. (1913), is undoubtedly a Chalcidine, which I cannot at present separate from *Trigonura*, Sichel (1865). I have examined Cameron's genotypes in both instances.

***Stomatoceras (Centrochalcis) exaratum*, sp. nov.**

Distinguished chiefly by the colour and the sculpture of the propodeon.

♀. A very dull black species, nowhere paler from the dorsal aspect and with the ventral surface nearly as dark, only the edges of the sclerites obscurely brownish, ovipositor hardly appreciably lighter below. Abdomen shining only on a portion of the 1st and 2nd segments. Antennae: scape brown, or medianly extensively blackish brown, lighter at base and apex; 1st funicular wholly clear reddish brown, 2nd like the first but narrowly darker dorsally and apically; remainder of the antennae nearly black; the extreme tip of the club obscurely paler in transmitted light. Wings: veins blackish brown; below the marginal and the uprise of the submarginal is a blackish brown band or cloud stretching to the posterior margin, before which it slopes towards the apical edge. Outside the dark area is a clear band descending straight at first below the end of the radius, then curving forward at about half-way to the posterior angle of the wing, before which it ends indefinitely; between this clear band and the broadly pale apex of the wing is a second blackish brown cloud,

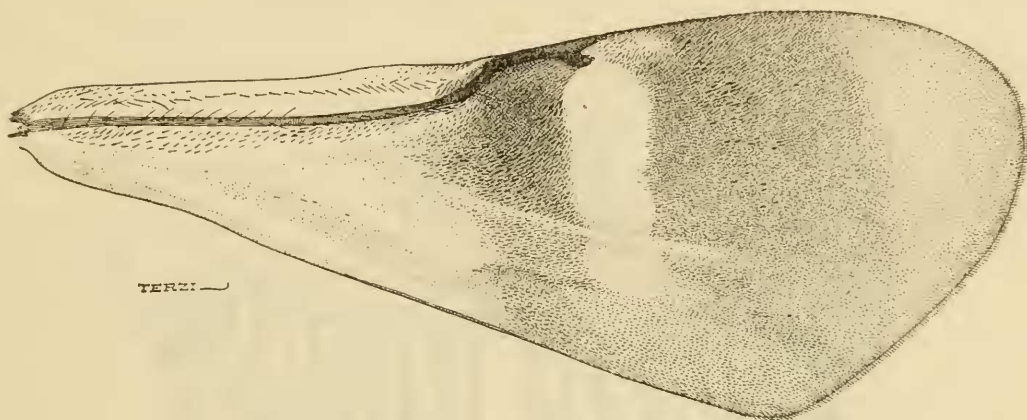


Fig. 3. Right wing of *Stomatoceras exaratum*, sp. n.

lighter posteriorly. Hind wing hyaline. Legs: all coxae black; fore and mid legs castaneous or reddish brown, only the claws and empodia black. Hind legs with the trochanters dark chestnut, this tint continuing mainly on the base of the femur outside, and along the ventral edge half-way to the median prominence, also on apex; femur otherwise black externally; internally the basal two-thirds black, merging gradually to castaneous at the apex. Tibia blackish brown, darkest along the lower edge, where it folds against the femur; tarsi dark castaneous. Pubescence generally silvery, refringent, but light tawny on the apex of the tibia and on tarsus of hind legs.

Head triangular from in front; breadth: depth, as 15:13; base line of the eye cutting the mid line at two-thirds. Orbits not very divergent; eyes at the base separated by two diameters, on the vertex by one and a half; eyes shortly and slightly pubescent. In width the head just exceeds the prothorax and about equals the abdomen, but is distinctly less than the distance between the extended tegulae (cf. *S. micans*). The punctures of the head bear, as on the thorax, minute stout silvery bristles, which form a definite row only along the orbits. *Antennae* twice the distance between the vertex and clypeal edge; length, 2.8 mm. Scape fourteen times as long as broad, and only a little shorter than the five succeeding joints;

pedicel one-fourth of scape, slender, length one-fourth (at the base) to one-third (at the apex) of the breadth. Joints from the scape onwards in the ratio 21, 10, 21, 18, 17, 16, 14, 13, 12; club 21, with only the first septum distinct, but probably in ratio 2:2:1; club not wider than the preceding three joints; length to breadth, as 7:3; funicle as a whole nearly cylindrical; the widest joints only one-eighth greater than the first, which bears only two or three sensoria at the upper apical angle. On all the succeeding joints the sensoria are numerous.

Thorax: the surface between the thimble-like punctures is rough, reticulate, the punctures setigerous, but most of the dorsal bristles fugacious. Scutellum broad apically, with widely divergent teeth whose inner edges contain a rounded obtuse angle. Metanotum: on each side 9-10 transverse, short ridges with quadrate punctures between. *Propodeon*: outside the long central cell are about seven similar cells separated by well-defined ridges which run back without cross-connections to a stout ridge rising at the outer angle of the petiolar hollow and running forward to the first projection behind the spiracle. Behind the ridge a dense long pubescence arises (fig. 4); the petiole is broadly based on the propodeon.

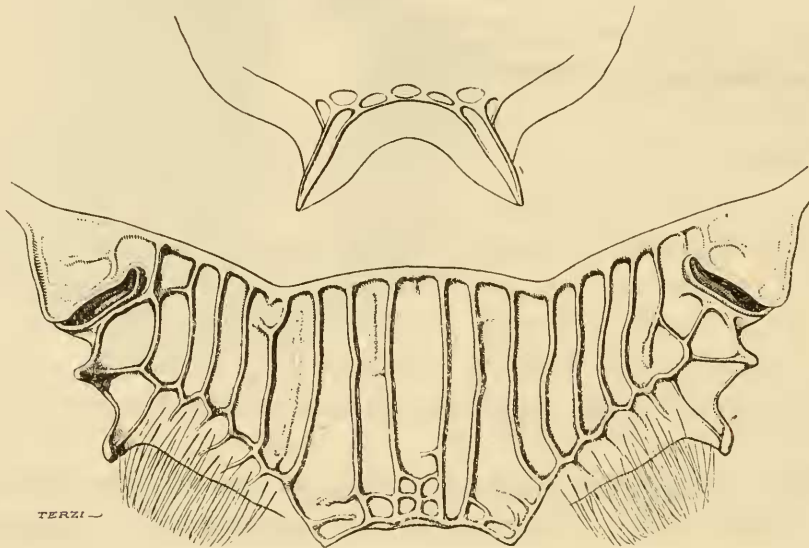


Fig. 4. Propodeon of *Stomatoceras exaratum*, sp. n.

Fore wings not quite two and a half times as long as broad; length, 2.85 mm.; breadth, 1.1 mm.; submarginal: marginal: radius: post-marginal, as 20:5:1:1; the post-marginal and the radius more exactly as 7:5. The submarginal bears 32 bristles up to the pustules at its junction with the marginal. Below the submarginal, from near the base onwards, is an irregular row of scales, which become two to three deep on the uprise to the marginal. Along the lower edge of the marginal, or immediately below, a single row of scales; on both bands a few scales occur irregularly mixed with stout short bristles. These are more numerous on the first band below the radius at the side of the clear band, and on the middle of the second band. *Hind wings*: length, 2.15 mm.; breadth, .65 mm. About eighteen bristles along the base of the costa; ten to twelve stiff bristles in the frenulum.

Legs resembling those of *S. micans*, and with similar proportions, but the under surface of the hind femur is produced into a deep rounded angular median lobe,

beyond which the edge is nearly straight, then swelling broadly out subapically; from the apex of the lobe the lower edge is minutely denticulate, the denticles numbering rather under fifty.

Abdomen broadly ovate, stout; from above, a line between the stylets and the petiole is cut by the edge of the first tergite in the ratio 3 : 2. The visible edge of the sheath of the ovipositor is one-half the dorsal edge of the preceding tergite. Tergite i. is smooth and shining, but minutely punctate on the posterior one-third especially, and more coarsely on the sides; tergite ii. with the puncturation feeble anteriorly, and more pronounced posteriorly; from tergite iii. onwards the surface is increasingly rougher, on vi. quite coarse and dull. Tergites i.-iii. are bare (mainly in the centre), but on their pleurae and elsewhere the surface is shortly and closely pubescent.

Length, 4-5 mm.; alar expanse, $5\frac{1}{2}$ - $7\frac{1}{4}$ mm.

NYASALAND: Monkey Bay, Lake Nyasa; 3 ♀♀ bred from puparia of *Glossina morsitans*, 31.v.15, 27.vi.15 and 9.vii.15 (Dr. W. A. Lamborn).

Type, a ♀.

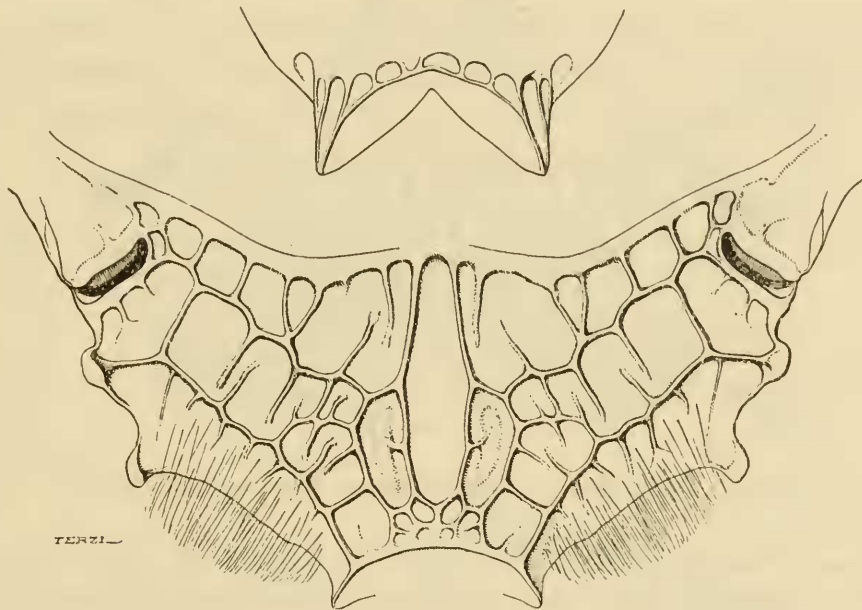


Fig. 5. Propodeon of *Stomatoceras octodentata*, Cam.

S. exaratum comes close to *S. diversicornis*, Kirby, (Journ. Linn. Soc. Lond. Zool., xx., p. 36, 1886) from Kassala, Egyptian Sudan, and *Stomatoceras (Centrochalcis) octodentata*, Cameron, (Zeitschr. f. Hym. Dipt., p. 230, 1905) from the Transvaal. The three forms may be separated most easily by the shape and sculpture of the propodeon. The colour differences (which are probably not very reliable) are as follows:—In *octodentata* the funicle is more extensively castaneous, only the last two joints and first divisions of the club dusky, while the tip is again paler. The legs are concolorous fuscous or blackish brown, the hind femora nearly black and the knees hardly paler. Kirby's type now lacks both antennae, but according to the description the "scape of antennae and joints 2, 3, 4 and 11" are "wholly red." All the femora and tibiae are blackish brown; the hind femora distinctly black. Fore and mid

tibiae reddish brown; hind tibiae apically lighter. Compared with *exaratum* the antennae of *octodentata* are longer and thinner, with the fourth and ninth joints relatively shorter, and the club distinctly so (only three-fourths of the scape), and there are more sensoria (6-7) on the apical half of the first normal funicular joint. Abdomen slender, and so elongate apically, that the stylets cut a line between the posterior edge of tergite i. and the apex of the sheath of the ovipositor at a point 7 : 6. In *exaratum* and *diversicornis* the abdomen is stout and the ovipositor short, so that the stylets lie at a point 16 : 9. The puncturation of the abdomen is variable, but in *octodentata* it is coarse and there are only narrow gleaming sutures between the tergites. The puncturation is finer and the sutures broader in *exaratum*. In the fore wings *octodentata* and *diversicornis* have 24-26 bristles on the submarginal, and the latter species has comparatively few scales, except below the marginal, where they lie 3-7 deep. There are practically none on the subapical cloud. *S. octodentata* has very scaly wings, many scales occurring in incomplete lines on the subapical cloud. Below the submarginal

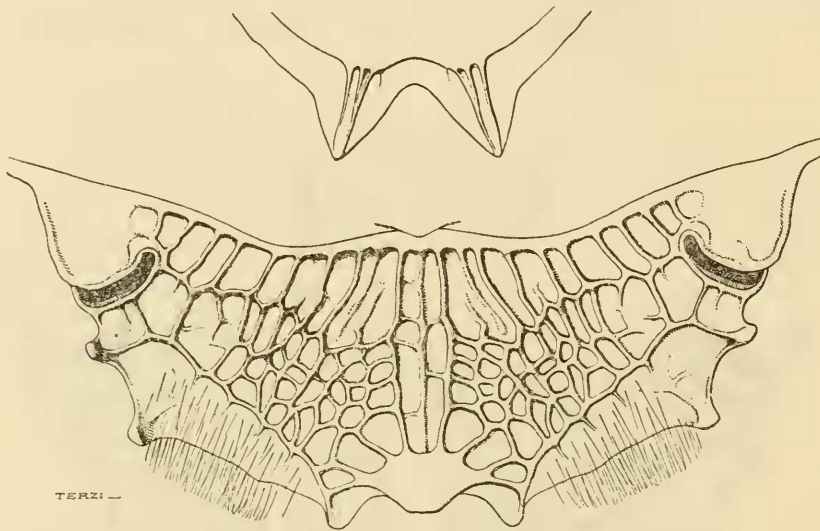


Fig. 6. Propodeon of *Stomatoceras diversicornis*, Kirby.

single scales occur nearly to the base. Near the base of the hind wings *octodentata* has a costal row of about ten minute bristles; in *diversicornis* there are three times as many bristles in this position. In *octodentata* the straight bristles of the frenulum are about eight, in *diversicornis* twenty-two, in number. In all three species the structure of the hind legs is the same. Kirby's description of the under side of the femur: "The middle tooth distinct, the others merely undulations" is misleading. The femur is fringed with minute equal denticles, and there is nowhere a major tooth; "the middle tooth" referred to being really a femoral lobe and itself edged with denticles (fig. 2, c).

Family ENCYRTIDAE.

Genus EUPELMINUS, D. T.

Eupelminus, Dalla Torre, Wien. Ent. Zeit., xvi, p. 85 (1897).

This genus, which comprises at present wingless Eupelmines with normal fore femora, straight-margined abdominal tergites and an unprojecting ovipositor, not improbably contains the apterous members of more than one genus. But the

category is convenient to use, and until the thoracic structure of its various components is better understood, any subdivision is inadvisable. Dr. Lamborn has reared a remarkable ♀ of this group, which I have described as fully as the condition of the specimen admits. Unfortunately the abdomen has been damaged, and one of the legs and an antenna are incomplete. The outline of the second and third tergites is thus not quite certain. The specimen moreover, has died in the characteristic Eupelmine (♀) pose, with the head thrown back to the fullest extent and the abdomen uplifted. It has not been possible to effect complete relaxation, but Mr. Terzi's patience has overcome many obstacles, and the outline figure he has supplied is thoroughly satisfactory (fig. 8). The long sclerite below the axilla is apparently the tegula (T) and the two minute triangular areas before this plate and the axilla are membranous. The large size, banded antennae, moulding of the head, tridentate mandibles, and the peculiar post-ocular bristly sulcus, along with the structure of the thorax and stout abdominal tergites, render this species easily recognisable.

Eupelminus tarsatus, sp. nov.

♀. A large dull brownish to brownish black species, with (in the single type specimen) few metallic reflections. These occur as follows:—above the clypeus, faint bronzy; on the frons, between and near the scrobes, a slight violaceous lustre; on the genae,

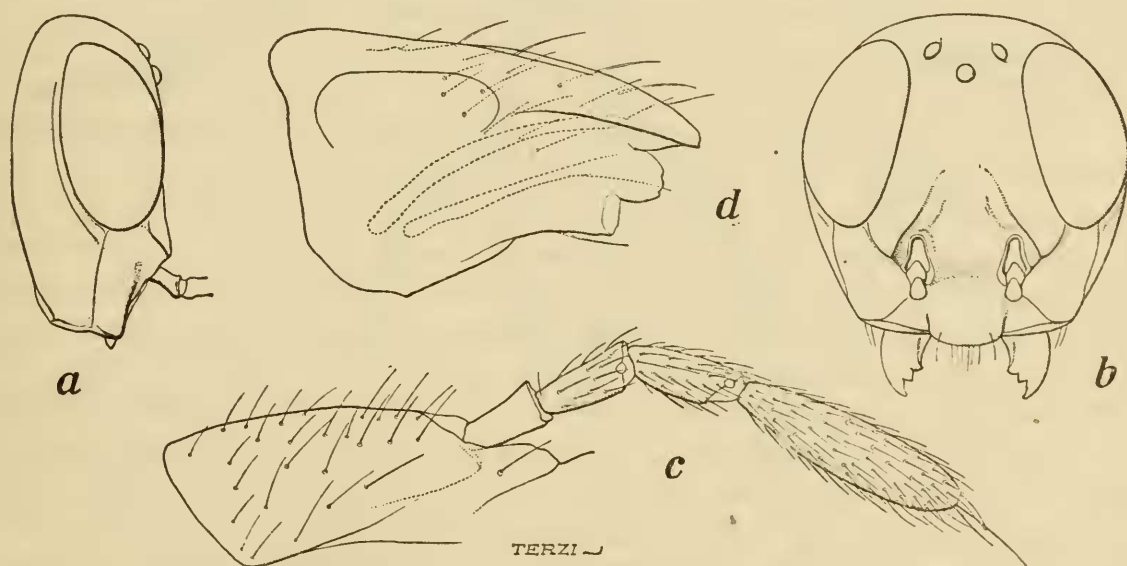


Fig. 7. *Eupelminus tarsatus*, sp. n.; a, head, profile; b, head, front view; c, stipes and maxillary palp; d, mandible.

behind the eyes, and malar keel, faint dark green; on the mesonotum, chiefly on the inside of the lateral ridges, and again on the upper surface of the hind coxae, dark blue. Seventh antennal joint (except the base), eighth entirely, and ninth (except the apex), pale, nearly white. The entire fore and hind legs (except the first tarsal joint, which is yellowish white), are blackish brown; mid legs like the others, but not so dark as the hind legs and with the first two tarsal joints narrowly pale above. Pubescence on the dorsum of the abdomen brown, on the sides whitish.

Head just deeper than broad; eyes ($\times 88$) very shortly pubescent, approximated towards the vertex, widely separated towards the mouth, so that the base line of the eyes is twice the shortest distance across the vertex; ocelli occupying rather more than the median third, and so far advanced that even the posterior pair lie on the anterior

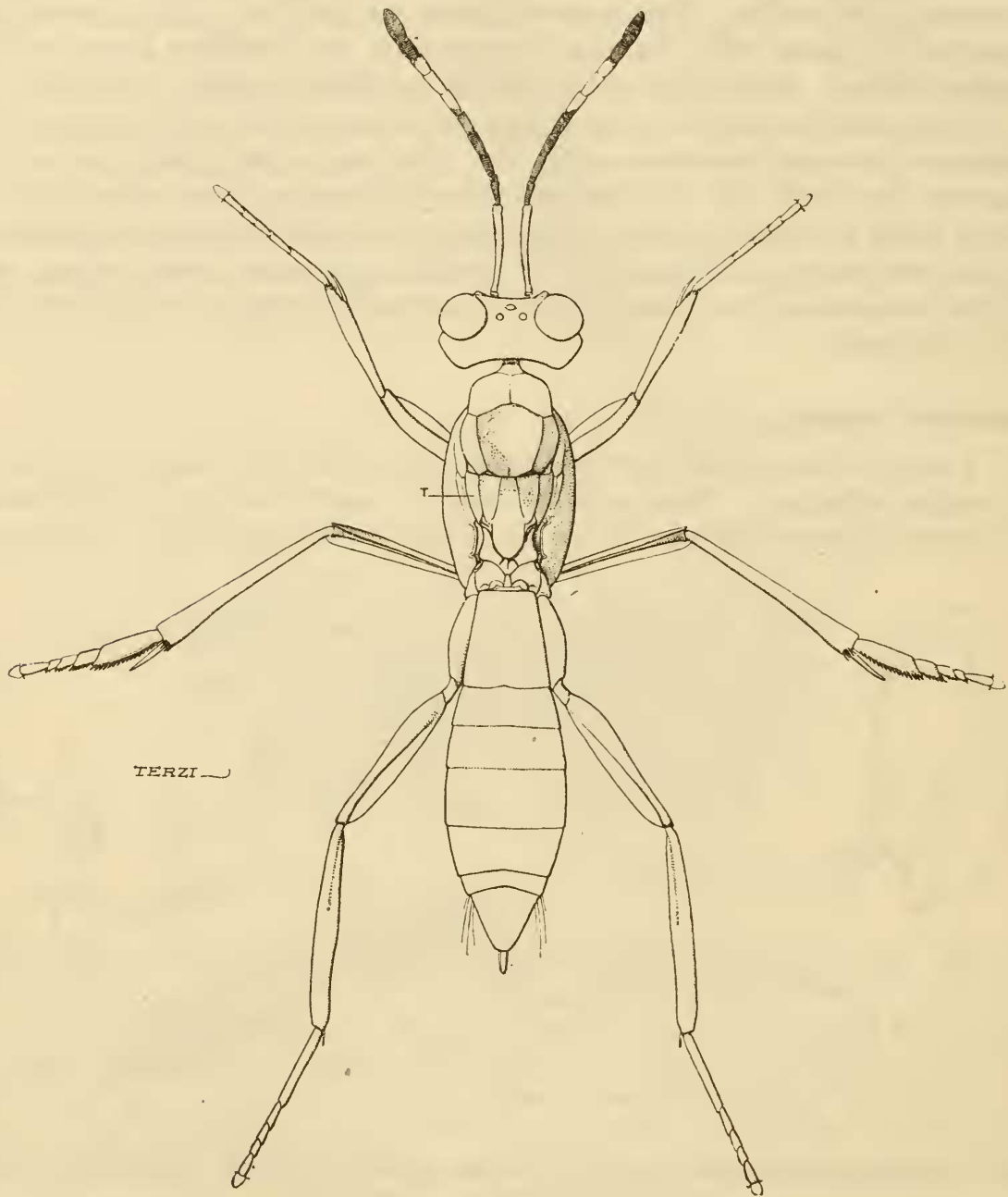


Fig. 8. *Eupelminus tarsatus*, sp. n., ♀.

slope towards the frons. Scrobes long, triangular, their longest diameter running with the depth of the head, just outside a line drawn from a corner of the clypeal edge to the corresponding lateral ocellus. The lower rim of the scrobes lies half-way between the clypeal edge and the base line of the eyes, while the upper angle is still below that line. Mouth-edge wide and straight, the clypeus advanced as a straight narrow median border. Malar keel fine; behind the eye from the keel to near the vertex runs a distinct sulcus bearing short glistening bristles. Below the ocelli the

frons is level, except where interrupted by the post-scapal hollow. This depression, extending half-way from the scrobes to the anterior ocellus is on the lower two-thirds deeply sunk at the sides, with sharply excavated walls, and medianly raised between and behind the scrobes. At the apex it is broadly rounded, merging gradually with the frons. There is another well defined edge, with a deep fall towards the malar keel and the mouth-edge, between the eyes and the scrobes. The whole surface of the head is finely reticulate, the pattern more flowing or striate on the post-scapal hollow.

Mouth-parts ; labrum with six bristles ; mandibles similar, broad and stout, narrowing apically, with three teeth, the lowermost acute, the middle one rounded, and the uppermost nearly rectangular. Three rows of bristles externally on the lower apical two-thirds. Maxillary palpus : stipes elongate, with thirty to forty bristles, mainly on the outer side ; palpus (5 : 6 : 7 : 15) with the first joint *bare*, and at its base, one-third of the last joint at its widest ; joints 2-4 covered with short stiff bristles, 2 and 3 bearing in addition a large clear pustule (sense organs ?). There are two or three strong hyaline terminal bristles (the longest not one-fourth of the last joint) and one stout hyaline spur. The mentum bears about eighteen bristles. Labial palpus (6 : 1 : 6) with all the joints bristly and the last swollen, the terminal bristle two-thirds as long ; the lingua bears about twelve setigerous cells.

Thorax : the whole surface refringent, unless otherwise noted, raised reticulate and mostly with minute scattered glistening appressed bristles. Prothorax porrect ; pronotum with two somewhat quadrate sclerites ; pre-episternite covered by overlap of protergite and smooth. Mesonotum flat above, with sharp ridges (parapsides ?) laterally. Side lobes curving downwards to the mesopleurae and nowhere dorsally flattened. Scutellum about the same length as the mid lobe, but from above apparently longer, as the thorax slopes more abruptly forward from the suture. The abscissa of the scutellum on the suture is less than the width of either axilla, and the bases of the scutellum and the axillae form a straight line. The sclerites of the axillae, and the mid and side lobes do not fit perfectly, the gap between being triangular. Axillae slightly over two-thirds the length of the scutellum, and in the same plane. Prepectus narrow and wedge-like, based posteriorly on the narrow and short mesepisternite, which lies below the very large tegula. On the mesopleurae the short bristles are placed principally antero-ventrally. Apically the scutellum is developed at the sides into two short rounded lobes ; here the tips of the tegulae and the sharp entero-lateral angles of the metanotum rest. Surface of the scutellum towards the apex coarser in texture ; metanotum and propodeon smoother and almost shining, though distinctly reticulate. Metanotum in the form of two triangular sclerites broadly joined medianly and reaching far forward ; at their junction is a short keel and traces of two others, one on each side. Propodeon like the metanotum, in two sclerites, with large antero-lateral spiracles opening anteriorly.

Legs : fore femur only moderately thick ; apparently without ventral fringe of long bristles. The mid tibial spur is about five-sevenths of the first tarsal joint, which bears nineteen teeth anteriorly and sixteen posteriorly ; the second has 6, 7 ; the third 4, 4 ; and the fourth 1, 1. There are also four teeth at the apex of the tibia anteriorly. In the hind leg, the tibia folds up flatly against the femur, which is posteriorly smooth and slightly grooved along its entire length. The apical tibial spur is short. In all the tarsi the proportions approximately are :—10, 5, 3, 2, 3.

The claws are minute. The first fore tarsal is nearly two-thirds the first hind tarsal joint. All the legs are long; the extended mid leg about three-fourths of the length of the insect. *Abdomen*: all the tergites sclerosed and with the proportions given in the sketch; the first tergite medianly shallowly incised; the others probably straight-edged. Anteriorly the pubescence is sparser, but dense posteriorly (from the fourth segment). Ovipositor slightly protruding.

Length about 5 mm.

Type a ♀.

NYASALAND: Monkey Bay, Lake Nyasa; bred from puparium of *Glossina morsitans*, 30.v.15 (*Dr. W. A. Lamborn*).

Family: *EULOPHIDAE*.

Syntomosphyrum glossinae, Wtrst.

S. glossinae, Waterston, Bull. Ent. Res., v, pt. 4, p. 365, figs. 14–16, and *ibid.* vi, pt. 1, p. 81 (1915).

This species has now been shown by Dr. Lamborn to be a hyper-parasite of *Glossina morsitans* through *Mutilla glossinae*, Turn.

NYASALAND: Monkey Bay, Lake Nyasa; 13 ♀♀ bred from a puparium of *Glossina morsitans*, 17.vi.15 (*Dr. W. A. Lamborn*).

These are presumably part of the parent stock from which Dr. Lamborn conducted the breeding experiments noted below. The numbers of each sex detailed are those actually received by the Bureau.

“These tiny Chalcids were bred from two female parents which with the male parents also emerged from the same pupa. Coitus 20.vi.15.”

- 125 a. Tsetse pupa parasitised by Mutillid on 17.vi.15. Chalcid at work on it on 23.vi. Offspring emerged on 27.vii, eleven in all.
11 ♀♀ (34 days).
- 125 b. Pupa parasitised by Chalcid on 24.vi; offspring, eighteen in all, emerged on 27.vii.
15 ♀♀ (33 days).
- 125 c. Pupa operated on by Chalcid on 25.vi. and offspring—thirteen—emerged on 29.vii.
13 ♀ (34 days).
- 125 d. Pupa operated on by Chalcid on 27.vi. and offspring—thirty-six—emerged on 29.vii.
7 ♂, 24 ♀ (32 days).
- 125 e. Pupa which was then chipped and showed the cocoon of the Mutillid, was operated on by the Chalcid on 28.vi., and the Chalcid's offspring, 29 in all, emerged on 1.viii.
1 ♂, 28 ♀ (34 days).
- 125 f. Pupa was operated on by the Chalcid on 25.vi., and the offspring, numbering 32, came out through the holes on 2.viii.
1 ♂, 31 ♀ (38 days).

- 125 *g.* Pupa was operated on by the Chalcid on 26. vi., and the offspring, numbering twenty-three, came out through two holes on 4. viii.
2 ♂, 20 ♀ (39 days).
- 125 *h.* Pupa was operated on by the Chalcid on 2. vii, and the offspring, numbering twenty-one, emerged on 6. viii.
4 ♂, 17 ♀ (35 days).

Of the specimens received the males are just over 7 per cent. of the whole. The average length of the life-cycle from egg to imago would appear to be five weeks.

In these Nyasaland *S. glossinae* the coloration is richer than in the type, the pedicel and funicular joints being dark and the club as a rule entirely pale.

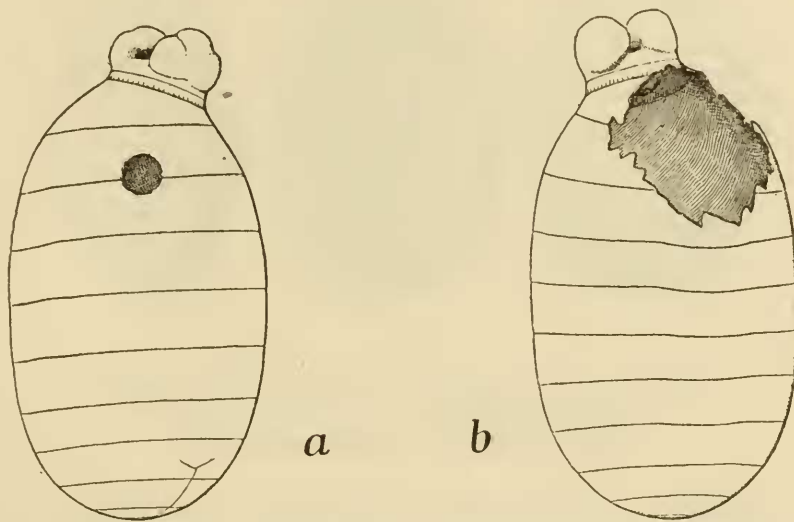


Fig. 9. Puparia of *Glossina* showing holes of emergence of :
a, *Syntomosphyrum glossinae*, Wtst. ; *b*, *Stomatoceras micans*,
Wtst.

Emergence of parasites (fig. 9). The aperture made by *Syntomosphyrum* is small and circular. In six out of eleven puparia examined, the entire brood has used the same hole. In another, two holes, one anterior and one posterior, have been pierced ; in another, two holes approximated, forming an 8-shaped aperture. In the rest the original hole has been enlarged and has become irregular. *Syntomosphyrum* emerges indifferently at any point on the puparium.

Stomatoceras spp. apparently prefer an exit gnawed posteriorly. In four out of five puparia examined the hole is in this position. The aperture is large, very irregular, without any distinctive feature. That of *Eupelminus* differs only in being smaller.